Physical Therapy Examination and Treatment for 18-Year-Old Female with Central Sensitization Post MVA: CASE REPORT

By

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Abstract

Background and Purpose

Pain is a global problem that affects about 1 in every 5 adults. Little is known about central sensitization, and its treatments. Common consensus is that treatment should be more central than local. The purpose of this study was to give specific physical therapy treatments to a patient diagnosed with central sensitization.

Case Description

The patient is an 18-year-old-female who was in a car accident 3 week prior to initial evaluation. No significant red flags were present, and no comorbidities. The patient presented to the clinic with left shoulder pain, left wrist pain, low back pain, bilateral knee pain, and right ankle pain.

Outcomes

The patient improved in her Lower Extremity Functional Scale (LEFS) by 57 points, Modified Oswestry by 18 points, and numerical pain rating score (NRS) by 8 points. All of these measures were significantly different.

Discussion

The patient made significant progress in the LEFS, NRS and Modified Oswestry outcome measures. This patient was healthy and young which may have contributed to the progress made. This article outlines specific interventions to assist patients diagnosed with central sensitization.

Background and Purpose:

Pain is an ever-growing problem across the globe. Some estimates state an estimate of 1 in 5 adults around the world suffer from pain each year.[1] Little is known of the incidence and prevalence of central sensitization (CS). However, it is still a problem encountered by physical therapists. CS is characterized by widespread pain, or severe and prolonged pain after a non-painful stimulus is given.[2] Other key factors of central sensitization is the presence of allodynia, which is sensation of pain from a non-painful stimulus. Another common symptom of CS is hyperalgesia or the sensation of more pain than should be elicited.[3] Jo Nijs et al provides a good flow sheet to follow when examining someone suspected to have CS.[4] One problem with treating CS is no clear plan of treatment has been given in treating someone with CS, and it is agreed that local treatment options are ineffective. Rather a central approach is the best course of treatment.[2,3] This article describes specific physical therapy treatment provided to a patient diagnosed with CS.

Case Description:

The patient was an 18-year-old female who was in a motor vehicle accident (MVA) 17 days prior to coming to physical therapy. She saw a physician within 4 days and was prescribed pain medication but had ceased the medication reporting no benefits from the medication. The patient also received an initial evaluation from a different physical therapist. However, due to insurance, coverage was transferred to a different clinic. Overall, she was a healthy individual with no major comorbidities or history of medical conditions. The MVA was described as the patient being in a stationary car and then being hit from the rear. The oncoming vehicle was traveling around 35 miles per hour. The patient was hit in a way that caused her body to collide with the car door beside her on the left side and her left hand hitting the steering wheel with enough force to cause a piece of the steering wheel to break off. Her primary complaints were pain in her left shoulder, left wrist, low back, bilateral knees, and right ankle, inability to sleep through the night, and unable to work. The physical therapist she saw prior gave her light exercises of bridges, calf raises, and knees to chest. No progress had been made with her symptoms prior to her initial evaluation at this clinic.

Examination:

Prior to the initial evaluation the patient had x-ray imaging done on her left wrist and the patient reported the imaging showed a hairline fracture but could not report the location and was unable to provide any imaging. She also had an MRI of her left shoulder ordered for a suspected rotator cuff tear but had not had this imaging done yet. Due to the number of complaints the patient had, and because not all imaging had been completed, the PT did not examine the wrist and the shoulder at the initial evaluation. The patient also filled out a LEFS[5], UE QuickDash[6,7], and a modified Oswestry[8,9] prior to initial evaluation. These tests were chosen because of their reliability, and validity.[5,7,9]

The patient came into the initial examination wearing a soft brace on her left wrist. She came into the initial evaluation with a pain rating of 4/10 on the NRS.[10] The patient was able to give history with no difficulty. However, as soon as the physical therapist progressed the evaluation to range of motion and manual muscle testing, the patients pain spiked to 9/10 on the pain scale. The patient was able to perform full knee extension and transfer into long sitting. The patient was able to tolerate long sitting for about a minute and then asked to move back to sitting edge of bed. The patient's pain never returned to baseline. With palpation of each patella the patient's pain would spike from low back to just above the ankles. After sitting edge of bed, the patient's pain would decrease to 7/10, and remained there for the duration of the examination. She reports this was the same at home. The formal evaluation ended after this because of the patient's tolerance level. The prognosis of central sensitization is poor.

Further examination was done in future treatment sessions as her tolerance increased. The MRI returned showing no tear in her rotator cuff but did showed signs of swelling from trauma. Her

left shoulder range of motion was evaluated on 7-9-2021 and the patient had full range of motion but had pain with the last 10 degrees. Her left hip flexion was limited to 115 degrees with pain in the last 5 degrees of her range.

Intervention

The first three treatments were designed to decrease the patient's pain to help her sleep throughout the night. The patient was given isometrics and nerve glides in clinic and at home because of their ability to decrease pain.[11,12] The patient's tolerance level was still very low, and she was uncomfortable during the nerve glides. During the first four treatment sessions, nerve glides were performed only at the ankle while moving the ankle into dorsiflexion and plantar flexion, while the patient was long sitting. This was done because of the patient's tolerance level. After four sessions of doing ankle nerve glides, the patient was progressed to straight leg raise nerve glides. The leg raise nerve glides were done with the patient in supine with a wedge underneath the patient's trunk, then the ankle was put into dorsiflexion as the straight leg was raised into hip flexion and then extended back to neutral with the ankle in plantarflexion.

Since the patient had difficulty with so many areas and treating them all was not possible with the time permitted the therapist instructed the patient to pick her two most painful areas to treat that day. The exercises given were focused on those areas. The treatments do not follow a traditional progression because of this. Table 1 shows the exercises and dates each exercise was performed. The prescription for the bike, elliptical, and recumbent stepper exercises was 10 minutes. All other exercises were prescribed as three sets to fatigue because of the patient fluctuating tolerance levels.

Outcomes:

Through the course of treatment, the patient showed significant progress in all outcome measures. Table 2 shows the progression of outcome measures through the course of her treatment.

Overall, the patient responded well to treatment. On the patient's second to last treatment day, she was instructed to wait at least 7 days before returning. The purpose of this was to see how the patient was able to respond with her home exercise program (HEP) alone. She returned with no complaints and said she was able to perform all tasks required for work and daily living.

Unfortunately, prior to her treatment on 7-20-2021 she had an event at home that resulted in the laceration of her left hand. This ceased all treatment in that area for the remainder of her therapy. She was given a new referral to return for rehabilitation specifically on that hand in six weeks.

Discussion:

This patient was able to respond positively with exercise interventions with some manual therapy. She increased her LEFS score by 57 points with the MCID for the LEFS being between 5.5-12.5 depending on pathology.[5] Her UE QuickDash score improved from by 9 points with MCID being 15.92 points.[7] Her Modified Oswestry score changed by 18 points with an MCID being 6 points.[9] Pain changed by 8 points with an MCID for NRS being 1.65 points.[13]

This patient was young and had an acute injury which could explain the rapid progress in 6 weeks. If this patient had been an older, had a chronic pathology, or had a comorbidity then the duration of therapy would probably be lengthened considerably.

The strength of this case was the use of exercise and nerve glides to treat the patient's pain. Another strength was the patient's adherence to her HEP. A limitation was the inability to fully treat the hand/wrist of the patient. Had the laceration not occurred therapy may have continued to further rehabilitate the fracture. Another limitation was this study did not look at any factors outside of physical therapy like legal implications involving treatment after an MVA or possible psychiatric problems from the trauma.

This article shows that physical therapists can assist in the treatment and well-being of people with central sensitization. While central sensitization is a complex and varying pathology. PT's can examine, treat, and benefit those with central sensitization. Further research needs to be done on the effects this treatment plan can have on others with central sensitization. If it can be effective in patients that are older or have comorbidities.

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Tables and Figures

Table 1	6/15	6/18	6/25	6/30	7/2	7/9	7/14	7/16	7/20	7/30
Shoulder Isometrics	X									
Chair Flexion with Ball	X				X	X	X			
Seated Extension with Ball	X									
Recumbent Stepper		X			X					
Ball 90/90		X	X							
Squats with Ball on Wall				X						
4 Way Hip Open Chain		X		X		X		X	X	
TG			X	X				X		
Recumbent Bike						X		X		
Elliptical										X
Bridges			X							
Theraputty				X		X				
Therabar				X		X				
Wall Clocks Slides				X	X					
Reverse Lunge with Shoulder Press							X			
Palloff Squat									X	
Step Ups									X	
Dead Lift										X
Monster Walks										X

Table 2	6/18	6/24	6/25	7/2	7/9	7/14	7/16	7/20	7/30
Numerical pain rating scale	9	10	7	6	-	8	4	4	1
Lower Extremity Functional Scale	21/80							78/80	
Upper Extremity QuickDash	38% Impaired Functioning							18% Impaired Functioning	
Modified Oswestry	21/50 or 42% Impaired Functioning							3/50 or 6% Impaired Functioning	
Shoulder Flexion					180				180
Hip Flexion					115				120